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WAR DEPARTMENT

TECHNICAL MANUAL



ORDNANCE MAINTENANCE

COMPASS M2

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# ORDNANCE MAINTENANCE

## COMPASS M2

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**1. Scope.**—*a.* This manual is published for the information and guidance of ordnance maintenance personnel. It contains detailed instructions for inspection, disassembly, assembly, maintenance, and repair of the compass M2, supplementary to those in Field and Technical Manuals prepared for the using arm. Additional descriptive matter and illustrations are included to aid in providing a complete working knowledge of the matériel.

*b.* Information on the packing, storage, and equipment of the compass M2 is not available at this time but will be included in a revision of this manual.

**2. Characteristics.**—The compass M2 is a multiple-purpose instrument used for obtaining clinometer, angle-of-site, and azimuth readings. It is used as a reconnaissance instrument for the Field Artillery. The compass M2 is the standard compass of the Field Artillery. The prismatic compass M1918 is the limited standard item used for the same purpose.

**3. Description.**—The compass M2 (figs. 1 to 3, incl.) measures overall about  $2\frac{3}{4}$  by  $1\frac{1}{8}$  inches when closed and weighs about 8 ounces. This instrument is made of nonmagnetic materials except the magnetic needle and the needle pivot. Principally, this compass consists of the following major units: A body and related parts, an angle-of-site mechanism and related parts, a magnetic needle with lifting mechanism, an azimuth scale and adjuster, and front and rear sights.

*a. Body and related parts.*—(1) The body is provided with a circular glass window held in place by a split retaining ring. This window keeps dust, wind, and moisture from the interior of the instru-



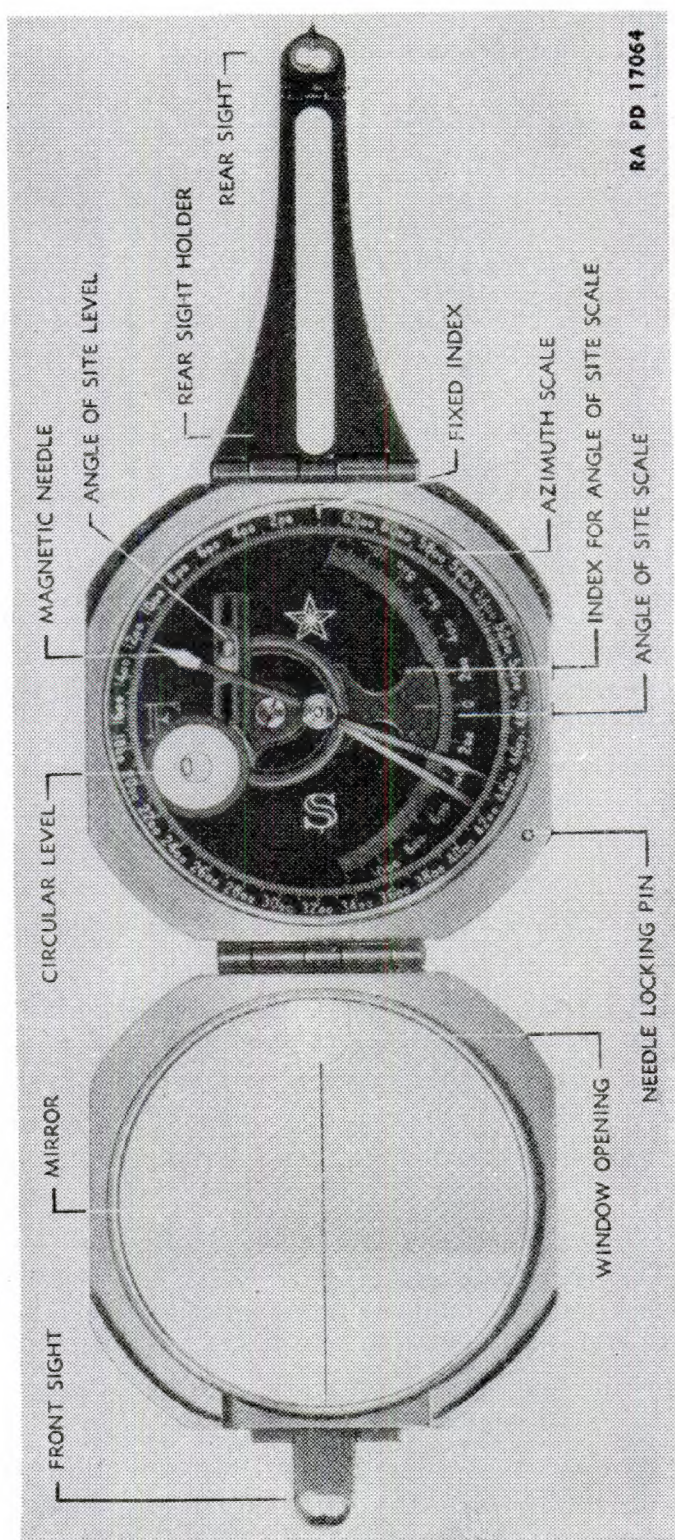


FIGURE 1.—Compass M2—cover open.



ment and protects the internal parts from possible damage and unintentional adjustment.

(2) The cover is attached to the body by means of a hinge assembly. The cover contains the mirror, held in position by a split retaining ring. A hole in the cover coincides with the small oval window in the mirror. A black center line is engraved across the face of the mirror.



FIGURE 2.—Compass M2—cover closed.

The hinge assembly contains an escutcheon pin which serves to parallel the cover with the body when the instrument is fully opened.

*b. Angle-of-site mechanism and related parts.*—(1) The angle-of-site index is attached to the lever assembly by means of a screw passing through the bottom piece of the compass. The arc-shaped slot in the index provides clearance for the adapter upon which the compass needle is mounted. The center of the circular part of the index is bent slightly upward, which causes the index to press against the bottom piece, creating friction between these parts. This friction prevents the angle-of-site mechanism from moving



unless actuated by its lever. The lever is knurled on one end to provide a grip for the fingers of the operator.

(2) The level assembly consists of a tubular level vial and a circular level vial inclosed in housings which are sweated onto a bracket. This bracket is fastened to the lever assembly by means of a screw. The circular level is used for leveling the instrument in a horizontal plane and the tubular level is used for leveling the angle-of-site mechanism in a vertical plane.

(3) The angle-of-site scale and the four points of the compass represented by three letters and a star are engraved on the bottom piece. The *E* and *W* letters are reversed in order that courses may

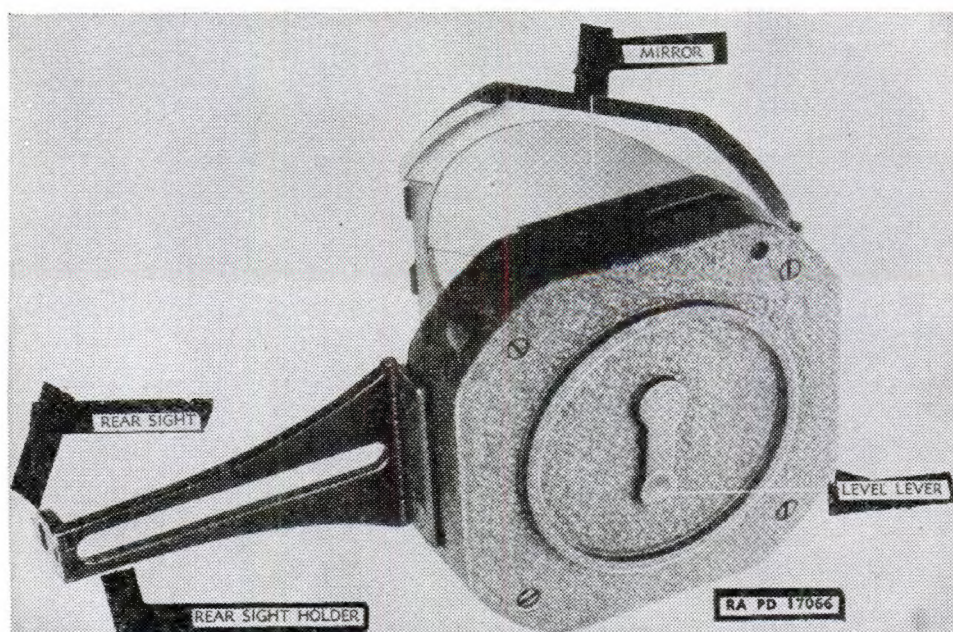


FIGURE 3.—Site—side view.

be read directly from the face of the compass. The angle-of-site scale contains 120 equally spaced graduations, each representing 20 mils. The 100-mil graduations are longer than the 20-mil graduations. The 200-mil graduations are longer than the 100-mil graduations and are numbered from 0 to 1,200 in both directions in 200-mil steps.

*c. Magnetic needle and lifting mechanism.*—(1) The magnetic needle assembly consists of a magnetized needle, pointed on both ends, and a jewel housing in the middle. A piece of agate with a cone-shaped depression in its center is mounted in the jewel housing and pivots on the needle of the adapter assembly. This provides a bearing with a minimum of friction. The north-seeking end of the

needle is white; the rest of it is black except for the jewel housing. A thin piece of copper wire is wrapped around the needle to balance it (compensate for the dip).

(2) The adapter assembly consists of a needle pivot pressed into an adapter which screws into the center of the bottom piece of the compass.

(3) A lifting pin is located near the upper left-hand corner of the instrument. The lower end of the pin engages the needle lifting lever and the upper end projects slightly above the body of the compass. The arrangement is such that when the cover is closed the magnetic needle is automatically lifted from its pivot and held firmly against the glass window of the compass.

*d. Azimuth scale and adjuster.*—(1) The azimuth scale is held in the compass body by means of a split retaining ring. Teeth are cut on the under side of the scale to engage with the pin teeth of the adjuster. By means of this arrangement the azimuth scale may be rotated approximately 1,800 mils. The top surface of the scale, painted white, is divided into 320 equally spaced graduations, each representing 20 mils. The graduations, filled in with white, are numbered from 0 to 6,200 mils in 200-mil steps.

(2) The azimuth scale adjuster (fig. 4) is slotted on one end to permit rotation by means of a screw driver. The other end is constructed as a pin gear to engage with the teeth cut on the under side of the azimuth scale.

(3) The azimuth index is driven into the body through a hole covered by the rear sight hinge. The point protrudes into the interior of the compass and provides the means for orienting the azimuth scale to the local magnetic declination.

*e. Front and rear sights.*—(1) The front sight assembly is fastened to the body by two screws. When not in use the front sight is folded against the top surface of the cover.

(2) The rear sight assembly, fastened to the body by two screws, consists of a rear sight holder and a bracket. The rear sight is hinged to the holder, which in turn is hinged to the bracket. Provision is made for folding the rear sight against the window inside the cover and the cover is closed over it when the instrument is not being used.

**4. Carrying case M19.**—The carrying case M19 (figs. 5 and 6) is a velveteen-lined leather case constructed to fit the general contour of the compass M2. The cover of the case is kept closed by means of a snap fastener attached to the cover. A leather loop, attached



on the back of the case, permits suspension of the case from the belt of the user.

**5. Care and preservation.**—*a. Cleaning.*—(1) The following cleaning materials are to be used with this matériel:

- (a) Alcohol, ethyl (for cleaning the glass parts).
- (b) Solvent, dry-cleaning (for cleaning metal parts).
- (c) Paper, lens tissue.
- (d) Brush, camel's-hair.

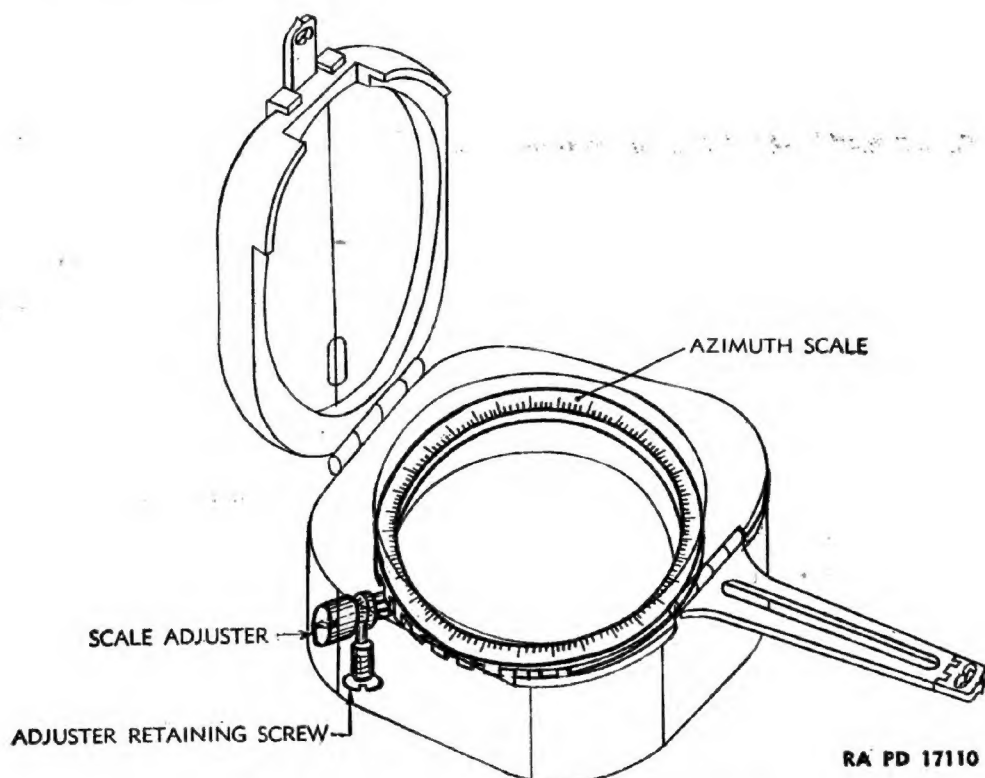


FIGURE 4.—Azimuth scale adjustment mechanism.

(2) Care should be exercised when cleaning the mirror that no ethyl alcohol overruns onto the edges of the mirror. The mirror is set in putty and the alcohol might loosen this putty setting.

(3) Metal components should be cleaned by means of a clean cloth moistened with dry-cleaning solvent. Glass parts of the compass should be cleaned with ethyl alcohol and clean lens tissue paper.

(4) Wipe all dust, oil, or other foreign substances off the carrying case, using a damp (not wet) sponge. Allow the leather to become partially dry, then rub it vigorously with a soft, dry cloth.

*b. Care in handling.*—(1) *Compass M2.*—(a) This instrument should be handled carefully to avoid unnecessary shocks. Keep the



compass in the carrying case when it is not being used. After use in wet weather, wipe the compass dry before placing it in the carrying case.

(b) When the instrument is moved from one position to another or is not in use, the cover should be closed. This lifts the needle off its pivot and prevents injury to the pivot.

(c) Particular care should be exercised to prevent bending the sights or the cover hinge. Before closing the cover the rear sight

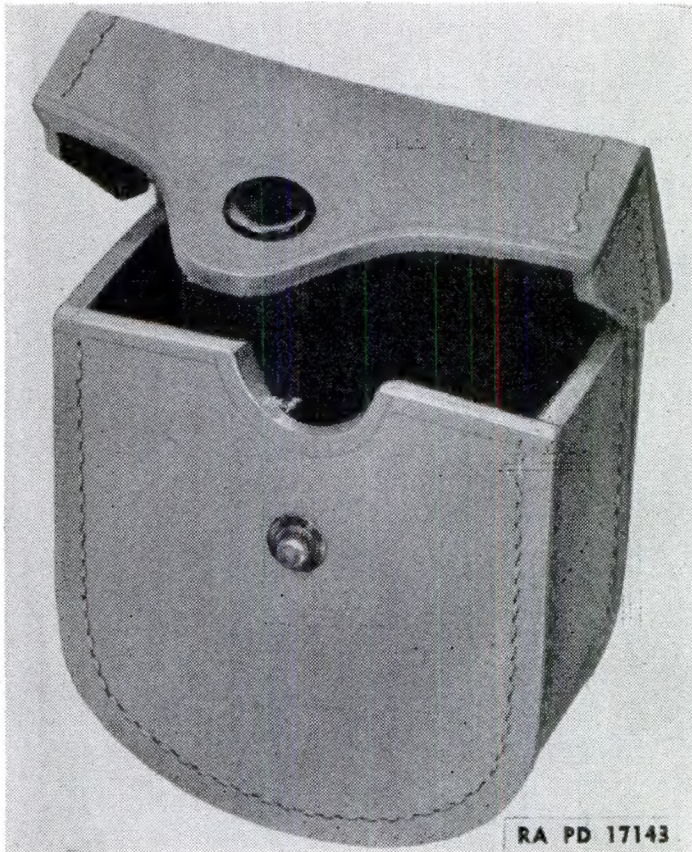
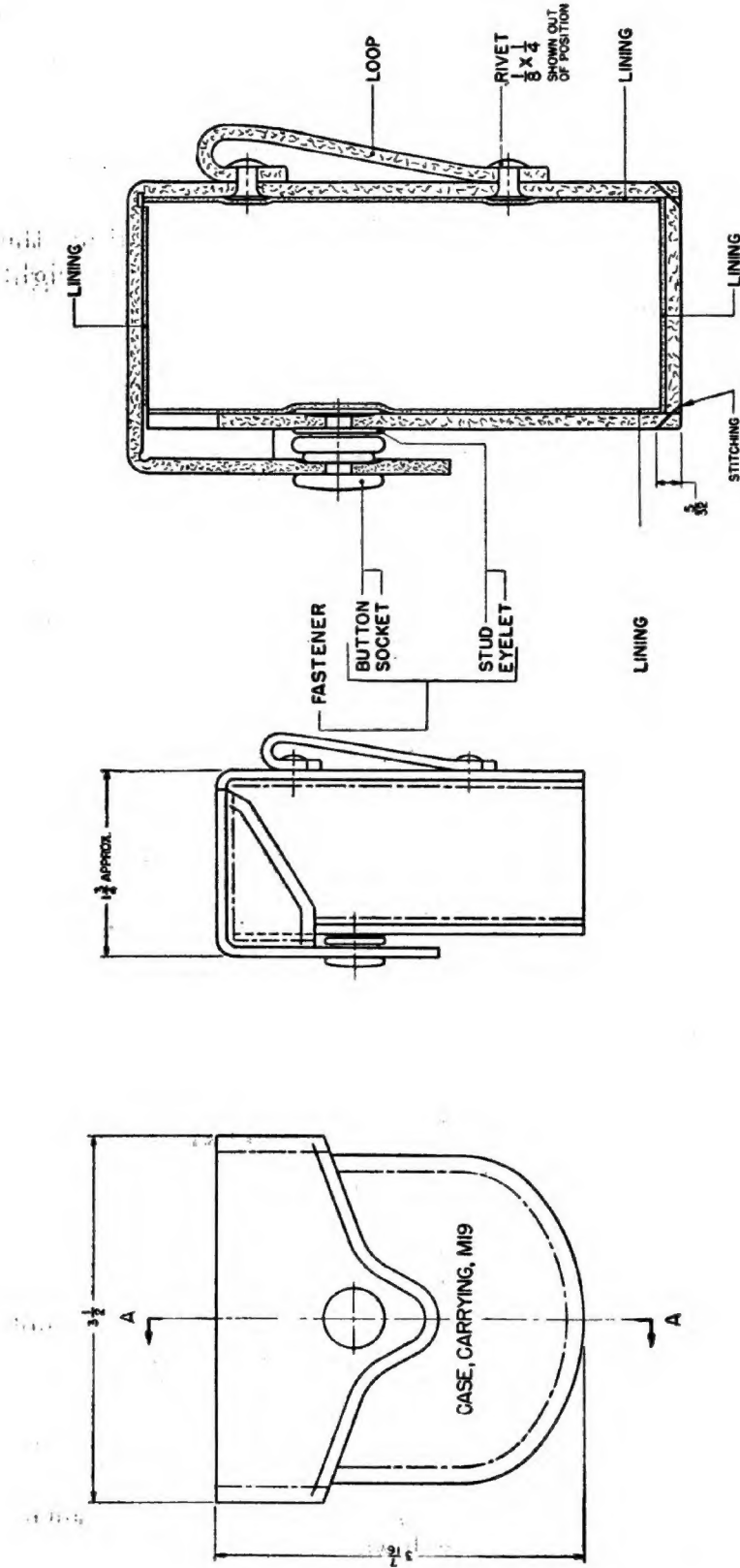


FIGURE 5.—Carrying case M19.

should be folded over so that it lies flat on the compass window. If this precaution is not observed, the window may be broken.

(d) When the instrument is stored for any length of time, do not place it in close proximity to electric motors, generators, transformers, or electric conductors carrying appreciable amounts of current. These set up electric fields which in time may weaken the magnetism of the magnetic needle.

(e) Moisture due to condensation may collect in the instrument when the temperature of the parts is lower than that of the sur-



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SECTION A-A

FIGURE 6.—Carrying case M19—assembly and sectioned views.



rounding air. This moisture, if not excessive, can be removed by placing the instrument in a warm place.

(f) No lubrication is required for this instrument.

(g) When the cover is open, the direct rays of the sun should not be permitted to fall on the instrument for any appreciable length of time. If this precaution is not observed, damage may result to the level vials.

(2) *Carrying case M19.*—(a) Keep the top piece fastened with the fastener provided at all times except when removing or replacing the compass. This prevents the entrance of dust and foreign objects into the case.

(b) At certain intervals, apply a small amount of oil, neat's-foot, to the leather. Climatic and service conditions are factors which determine the frequency of oiling. Experience has shown that during the first few months of use new equipment requires at least two applications of neat's-foot oil per month. Thereafter it is entirely a matter of judgment, as indicated by the appearance and pliability of the leather. Frequent light applications of oil are much more beneficial than infrequent heavy applications.

(c) If the leather has become wet from whatever cause, dry it in the shade. Never dry leather in the sun or close to a steam radiator, furnace, or boiler.

**6. Inspection.**—*a. Purpose.*—(1) Inspection is for the purpose of determining the condition of the compass M2, whether repairs or adjustments are required, and the remedies necessary to insure serviceability and proper functioning.

(2) The purpose of the basic inspection is to determine the condition of the compass and locate basic faults. As a result, proper disposition of the instrument can be made and the necessary action taken or recommended. Inspection forms (OO Form 7228 or OO Form 7229, fig. 7) are provided for recording the results of the inspection. Instructions concerning the entries to be made are printed on the back of the form.

(3) The detailed inspection is performed by the instrument repairman. The purpose of this inspection is to determine the specific repairs required to place the instrument in a serviceable condition. The inspection procedure may vary with each instrument, depending on the faults indicated by the preliminary inspection. Inspection forms and methods used in connection with the detailed inspection are described in TM 9-2602.





*b. Requirements for instrument.*—The following inspections are to be made:

- (1) Strength of magnetic needle.
- (2) Magnetic needle lifting mechanism.
- (3) Magnetic needle dip.
- (4) Alinement of mirror and rear sight.
- (5) Circular level vial adjustment.
- (6) Tubular level vial adjustment.
- (7) Alinement of front and rear sights.

*c. Tools and facilities.*—(1) An instrument repair kit containing common tools and supplies for instrument inspection and repair is furnished to ordnance maintenance companies. (This kit, instrument repair, replaces kits previously issued as kit, optical repair, for Field Artillery, and kit, optical repair, for harbor defense.) Most of the items in the kit, such as screw drivers, etc., require no description as their uses are self-explanatory.

(2) In addition to the above-mentioned tools, the following will be necessary to carry out the inspection:

- (a) Sensitive spirit level.
- (b) Common hand tools (screw drivers, wrenches, etc.).
- (c) Brass (or other nonmagnetic material) surface plate.
- (d) Sturdy work bench, affording clear vision to the front.

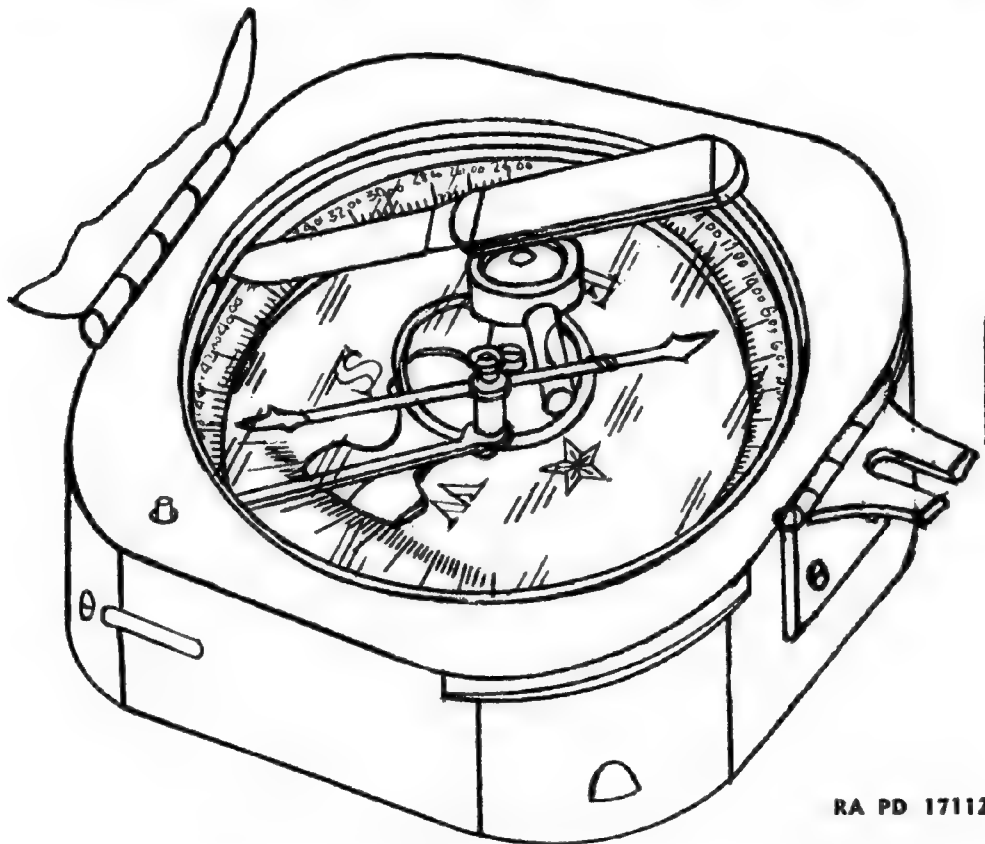
*d. Tolerances.*—Tolerances, or allowable errors, are specified wherever necessary to indicate the accuracy of performance of the instrument. In general, an instrument is considered unserviceable if the error in any part exceeds the specified tolerance. However, it must be realized that the specified tolerance is intended to serve mainly as a guide for the inspector, and must be supplemented by good judgment on the part of the inspector. These tolerances do not necessarily infer that the instrument repairman should not attempt to reduce the errors to lower limits if time and conditions permit.

*e. Basic inspection.*—(1) *General.*—Record the serial number of the instrument. Examine the compass M2 for completeness, general appearance, legibility of scales, condition of paint, and for loose, broken, or bent parts.

(2) *Level vials.*—Observe whether or not the level vials are broken. Remove the window retaining ring and window (figs. 8 and 9). Press down lightly on the tubular and circular level vials. Note whether the vials are firmly set in their housings. Replace window and window retaining ring.

(3) *Cover and sights.*—Uncover the compass and move the rear and front sights about their hinges. Note whether these parts move properly about their hinges without undue looseness or binding.

(4) *Azimuth scale adjuster.*—Loosen the adjuster retaining screw. Rotate the azimuth scale adjuster by means of a screw driver, alternately in one direction and then in another until the stops are reached. Note whether this motion is smooth, without binding or



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FIGURE 8.—Method of removing window retaining ring.

excessive looseness. After checking, tighten the adjuster retaining screw.

(5) *Magnetic needle.*—(a) *Polarity.*—Uncover the compass and place it on a leveled surface away from steel or iron objects. The white needle end should point toward the north. If this end points toward the south, the polarity of the needle has been reversed.

(b) *Needle lifting mechanism.*—Close the cover of the compass and shake it gently. Note whether any looseness of the magnetic needle can be perceived.

(c) *Movement of magnetic needle about its pivot.*—Open the cover and place the compass on a leveled surface plate. Displace the mag-



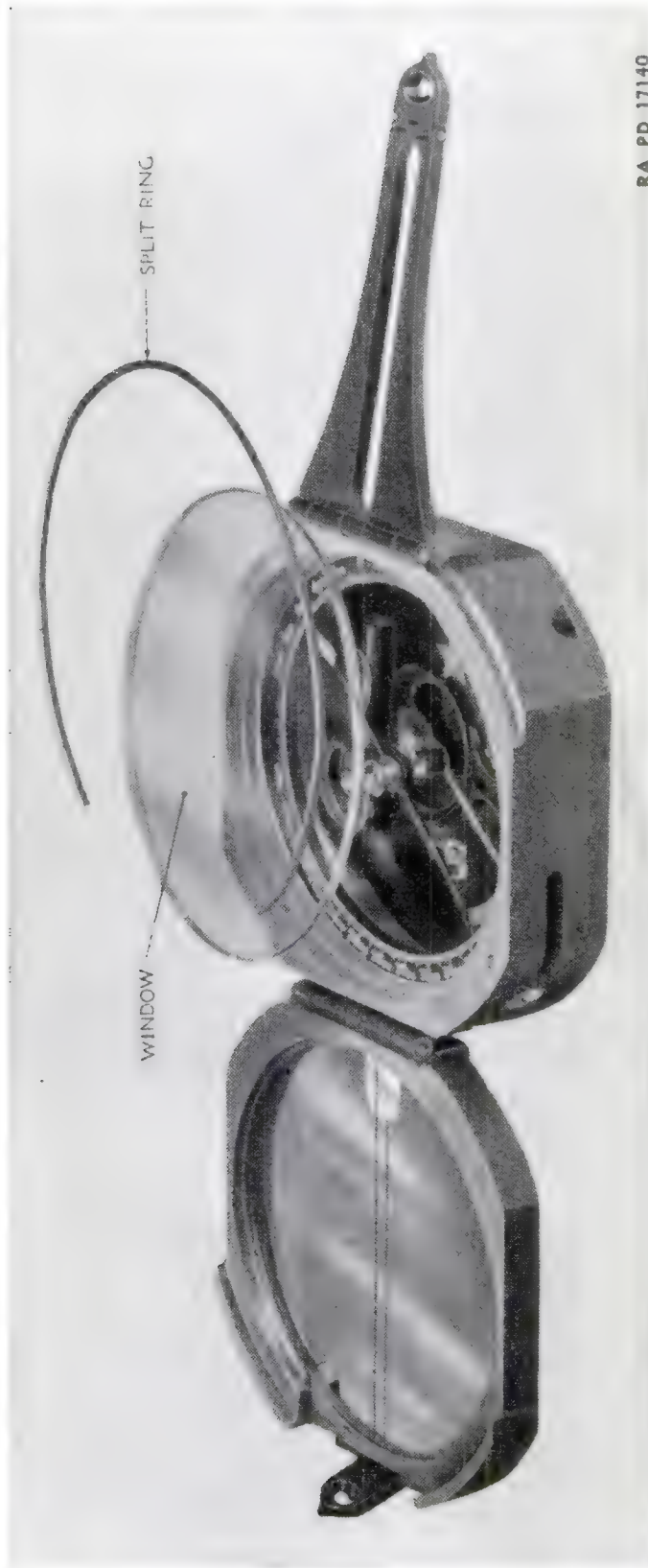


FIGURE 9.—Disassembly of window.

netic needle by bringing an iron or steel object close to it. Withdraw the object. Note whether the needle swings freely about its pivot and assumes the equilibrium position in a relatively short time.

(d) *Dip*.—Open the cover and place the compass on a leveled surface away from steel or iron objects. Note whether the ends of the magnetic needle are approximately level with the azimuth scale.

(6) *Movement of lever assembly*.—Move the lever assembly to the limit of its movement in each direction. This motion should be smooth, without excessive friction or looseness.

f. *Action to be taken*.—(1) Instruments found defective must be repaired or adjusted to render them serviceable. Defects noted and action to be taken must be entered on the inspection form for each instrument. The action to be taken will be governed by the facilities available. If the facilities of the section do not permit satisfactory repair or adjustment, the unserviceable instruments will be passed on to a higher maintenance echelon; replacement items should then be issued to the using arm.

(2) If no faults are found in the basic inspection, the instrument is determined to be in a serviceable condition. If minor faults which can be readily corrected are found, the necessary repairs should be made and the instrument thereby placed in a serviceable condition. Certain basic faults do not lend themselves to simple repair or adjustment, as they must be further localized before the necessary repair can be accomplished. If such faults are found, further inspection will be necessary to complete the inspection procedure in detail, and to determine the specific correction necessary to make the instrument serviceable. Procedure for detailed inspection and correction is given in paragraph 7.

**7. Maintenance and repair.**—a. *To inspect magnetic needle strength*.—(1) Place the compass with its cover open on a level surface. No magnetic materials should be placed in close proximity to the compass during the procedure.

(2) By means of an iron object such as a screw driver displace the magnetic needle about  $30^\circ$  from the equilibrium position. Remove the screw driver, allowing the needle to swing to the right and left of its equilibrium position. By means of a time-interval recorder, measure the time required for the needle to complete five periods. A period of the needle may be defined as the time required for the north-seeking end of the needle to move from its maximum displaced position right of the point of equilibrium, then to the extreme left, and back to the initial position. If the time recorded by the time-interval recorder is more than 20 seconds or more than 4 seconds per



period, the magnetism in the needle is weak. If this is the case, replacement of the magnetic needle is necessary.

*b. To replace magnetic needle.*—(1) Open the cover of the compass until the cover is parallel with the face of the compass. By means of a sharp tool pry the retaining ring out as shown in figure 8. Care should be exercised that the glass is not broken when the tool is pushed underneath the ring.

(2) Lift out the compass window and the magnetic needle assembly. Place a serviceable magnetic needle assembly in position, and replace the other parts in reverse order of the disassembly.

*c. To inspect magnetic needle lifting mechanism.*—Open the cover of the compass. Press the needle lifting pin down so that its end is flush with the compass body. Note the position of the magnetic needle with respect to the azimuth scale. Gently shake the compass while holding the needle lifting pin in the position mentioned above. Again note the position of the magnetic needle with respect to the azimuth scale. If there has been any noticeable movement of the needle, an adjustment of the magnetic needle lifting mechanism is necessary.

*d. To adjust magnetic needle lifting mechanism.*—(1) Remove the magnetic needle as explained in *b* above. Remove the needle sleeve.

(2) Remove the lifting lever from the compass. Bend the lever slightly and replace in the compass. Exercise care to see that the end of the lifting lever is placed underneath the lifting pin upon reassembly. Check the operation of the lifting pin and magnetic needle. Bend the lever slightly more, if necessary. Replace all removed parts in the reverse order of disassembly.

*e. To inspect magnetic needle dip.*—(1) Place the compass on an accurately leveled brass plate or other nonmagnetic surface. See that no magnetic substances are in close proximity to the compass. Remove the window retaining ring and window.

(2) Note whether the magnetic needle is level with the azimuth scale within plus or minus 0.031 inch. If the deviation is more than this, the sliding weight on the needle will have to be moved. The needle is balanced for the locality of manufacture. If the compass is moved to another locality closer or farther away from the North Pole than the manufacturing locality, an adjustment of the sliding weight will usually be necessary.

*f. To balance magnetic needle.*—(1) Lift the magnetic needle from its pivot. Slide the weight, consisting of several turns of copper wire, in accordance with the condition of unbalance (fig. 10). If the weighted end of the needle is above the azimuth scale, slide the

weight a short distance outward and if the weighted end of the needle is below the scale, slide the weight inward (toward the pivot).

(2) Place the needle on its pivot and check the adjustment. Repeat the adjustment if necessary. Replace all removed parts.

*g. To inspect alinement of mirror and rear sight.*—(1) Place the compass on a level surface plate. Lift up the cover so that it makes an angle of approximately  $90^\circ$  with the face of the compass.

(2) Lift up slightly on the rear sight and note whether the tip is in alinement with the lower part of the etched line on the mirror.

(3) Lift up further on the rear sight and move the cover toward the sight until tip of the sight is adjacent to the upper part of the mirror. Note whether the tip of the sight lines up with the upper part of the etched line on the compass mirror. If not, an adjustment of the compass mirror or replacement of the rear sight assembly is necessary.

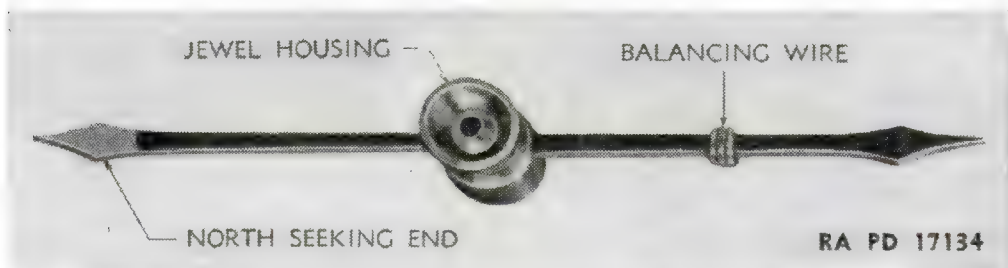


FIGURE 10.—Magnetic needle, assembly.

*h. To aline mirror and rear sight.*—(1) Hold the compass cover with the left hand, the cover first being opened to lie flat. With a sharp tool in the other hand, pry out the retaining ring (fig. 11). Shift the mirror until the etched line is in correct alinement with the sight tip. Replace the retaining ring by first placing the ends of the ring adjacent to the stop pins and then pressing the ring into its groove.

(2) Check the alinement as explained in *g* above. Repeat the adjustment if necessary. If alinement cannot be secured in this way, either the rear sight or the cover hinge is unserviceable and replacement of those parts is necessary.

*i. To inspect circular level vial adjustment.*—Place the compass on a level surface plate. Note the position of the bubble. If the bubble is not in the central position, adjust the circular level vial.

*j. To adjust circular level vial.*—(1) Remove the compass window by first removing the retaining ring (figs. 8 and 9). Carefully lift out the magnetic needle.

(2) Remove the level assembly by first removing the fillister head screw. Bend the bracket slightly. Replace the level assembly in the compass. With the compass on a level surface, check the position of the bubble. Repeat the adjustment if necessary.

(3) Place the edge of the compass on a leveled surface and adjust the angle-of-site index in the manner explained in *l*(2) below. Reassemble the removed parts in the reverse order of disassembly.

*k. To inspect tubular level vial adjustment.*—(1) Open the cover parallel with the face of the compass. Place the edge of the compass



FIGURE 11.—Method of removing mirror retaining ring.

on a flat, horizontal reference surface so that the angle-of-site index points toward this reference surface.

(2) By means of the angle-of-site lever, center the bubble in the tubular level vial. Note the indication of the angle-of-site index on the associated scale. If this indication is more than 10 mils, an adjustment is necessary.

*l. To adjust tubular level vial.*—(1) Remove the window retaining ring, window, and magnetic needle as explained in *b*(1) and (2) above. Place the edge of the compass on a flat, horizontal surface so that the angle-of-site index points toward this reference surface.

(2) Set the angle-of-site index to indicate zero on the angle-of-site scale. Loosen the index screw and shift the level assembly until the



bubble is centered. Tighten the index screw so that the angle-of-site index lever may be moved without excessive friction or undue looseness. Replace all removed parts.

*m. To inspect alinement of front and rear sights.*—(1) Open the compass so that the cover is parallel with the face of the compass. Place the edge of the compass on a flat, horizontal reference surface so that the angle-of-site index points toward this reference surface. Fold the rear sight holder out parallel with the face of the compass and the rear sight perpendicular with its holder. Fold out the front sight so that it is approximately perpendicular to the plane of the mirror.

(2) Place the edge of a piece of cardboard on this leveled surface next to the sight tips. Accurately draw a horizontal line on the cardboard, passing through the point touched by the tip of the rear sight. The tip of the front sight should also pass through this horizontal line within plus or minus 0.020 inch. Move the rear sight holder out approximately 30°. Again note whether the horizontal line passes through the tips of both sights within 0.020 inch. If the deviation from the horizontal is more than this, an adjustment is usually indicated.

*n. To aline front and rear sights.*—Loosen the screws by which the front sight is attached to the compass cover. Move the sight in direction of correct alinement and tighten the screws. If the alinement cannot be secured in this way and if the mirror and rear sight are properly alined, replace the front sight. For disassembly and reassembly procedure of the front sight refer to paragraph 8*i* and *j*.

**8. Disassembly and assembly.**—To preserve the parts of the instrument, it is necessary to exercise care and close attention during disassembly, cleaning, and adjustment. To avoid injury to the instrument the proper tools should be used for each disassembly and reassembly job. The extent of disassembly for any certain repair job is determined by the repairman when he makes his detailed inspection.

*a. To disassemble compass mirror.*—(1) Hold the cover firmly in one hand. Insert the blade of a sharp tool or penknife between split retaining ring and mirror near the end of the ring and twist the blade slightly, thus removing the ring (fig. 11).

(2) Extend one finger or a small blunt object through the window opening in the cover and push the mirror upward (fig. 12). Carefully slide the mirror out. Exercise care to avoid losing the shims underneath the mirror.

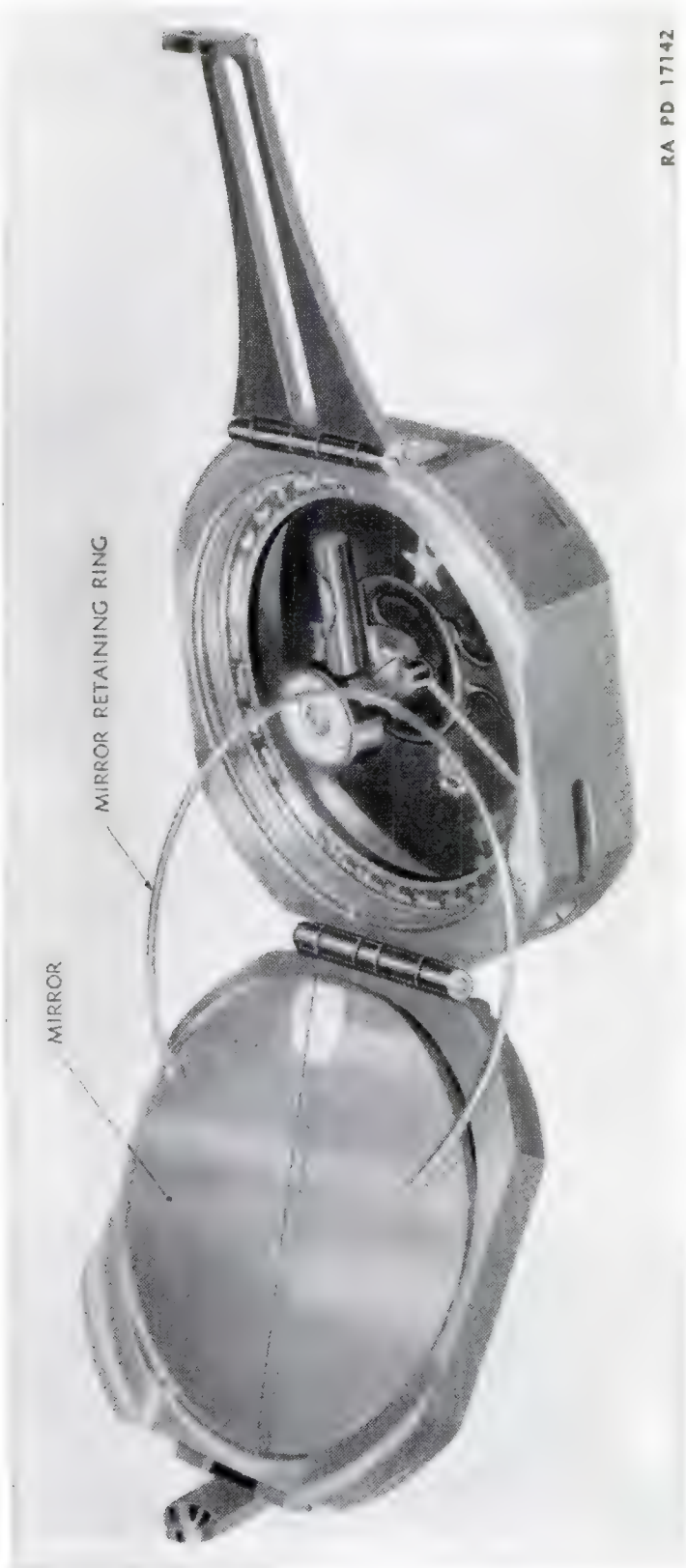


FIGURE 12.—Disassembly of mirror.

*b. To reassemble compass mirror.*—(1) Remove all old putty from the compass cover. Place a little putty on the upper edge of the cover. Follow the same procedure as for disassembly except in the reverse order.

(2) Aline the etched line of the mirror with the rear sight in accordance with instructions given in paragraph 7*h*.

*c. To disassemble magnetic needle and related parts.*—(1) Remove the split retaining ring by inserting a screw driver blade between the ring and the window (fig. 13). Care should be exercised that the screw driver blade does not slip away from its proper position during this procedure and do injury to the instrument or to the hands of the instrument repairman. Carefully lift out the window.

(2) Lift out the magnetic needle assembly and sleeve. Carefully lift up on the needle lifting lever and remove from the compass. Remove the needle pivot from the compass by unscrewing the adapter assembly from the bottom piece. Unscrew the lifting pin bushing. Extract the lifting pin from the compass body.

*d. To reassemble magnetic needle and related parts.*—(1) Replace the needle lifting pin with bushing in the reverse order of disassembly. When replacing the needle lifting lever, make sure that the end of the lever is underneath the lifting pin. To facilitate this procedure, temporarily turn the compass upside down when replacing the lifting lever.

(2) Replace the remaining parts in the reverse order of disassembly. When replacing the split retaining ring, put the ends of the ring in the groove first before pressing the ring into position.

*e. To disassemble level assembly.*—(1) Remove the window as explained in *c*(1) above. Lift off the magnetic needle assembly from its pivot. Remove the needle lifting lever.

(2) Unscrew the fillister head lever screw and remove the level assembly from the compass (figs. 14 and 15). Clean out all broken parts and the old plaster of paris setting.

*f. To reassemble level assembly.*—(1) Replace the tubular or circular level vial (whichever may be the case) and center it in the housing opening. Pack it with gypsum, calcined (plaster of paris) (SNL K-2) that has been mixed to medium consistency. After the plaster of paris has set, paint the exposed surface of the plaster of paris on the bottom side of the circular level vial and on the ends of the tubular level vial with black paint.

(2) Replace the level assembly in the compass and adjust the levels by following the procedure given in paragraph 7*j*(2) and *l*. Replace all removed parts in the reverse order of disassembly.



COMPASS M2

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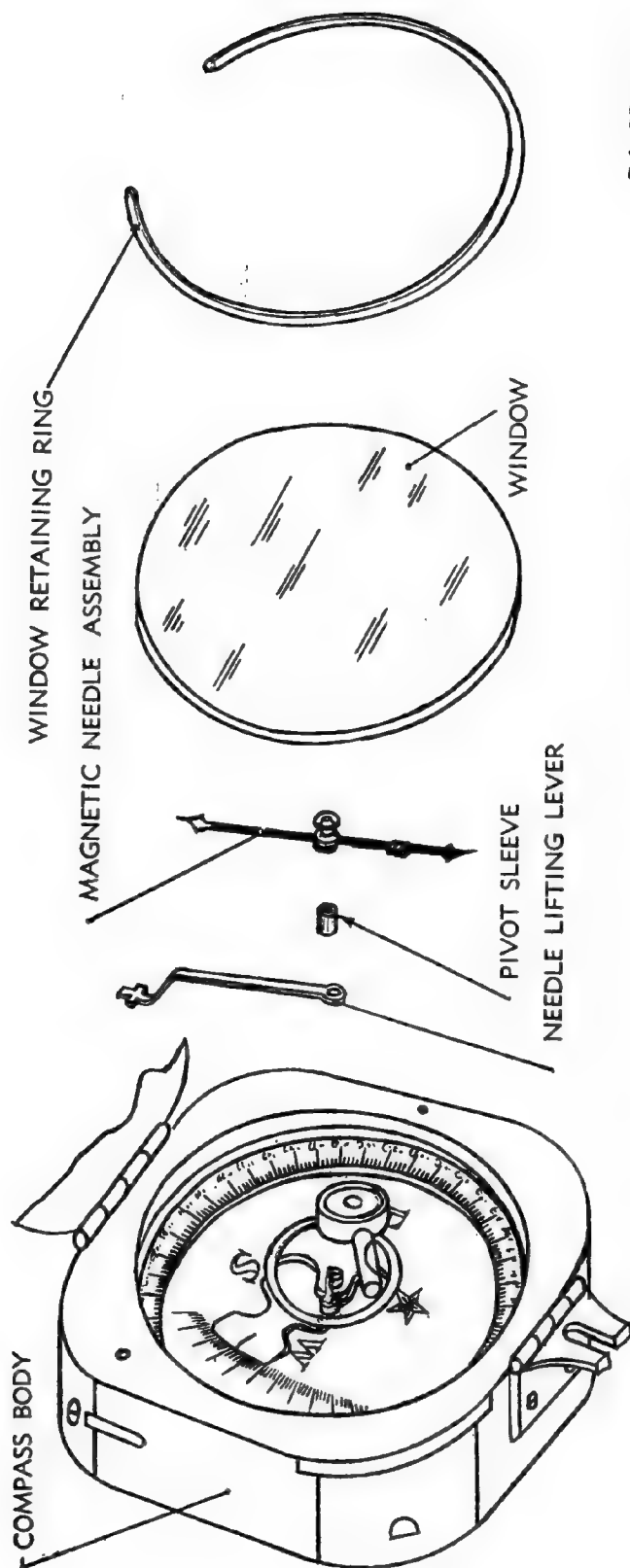


FIGURE 13.—Disassembly of magnetic needle and related parts.

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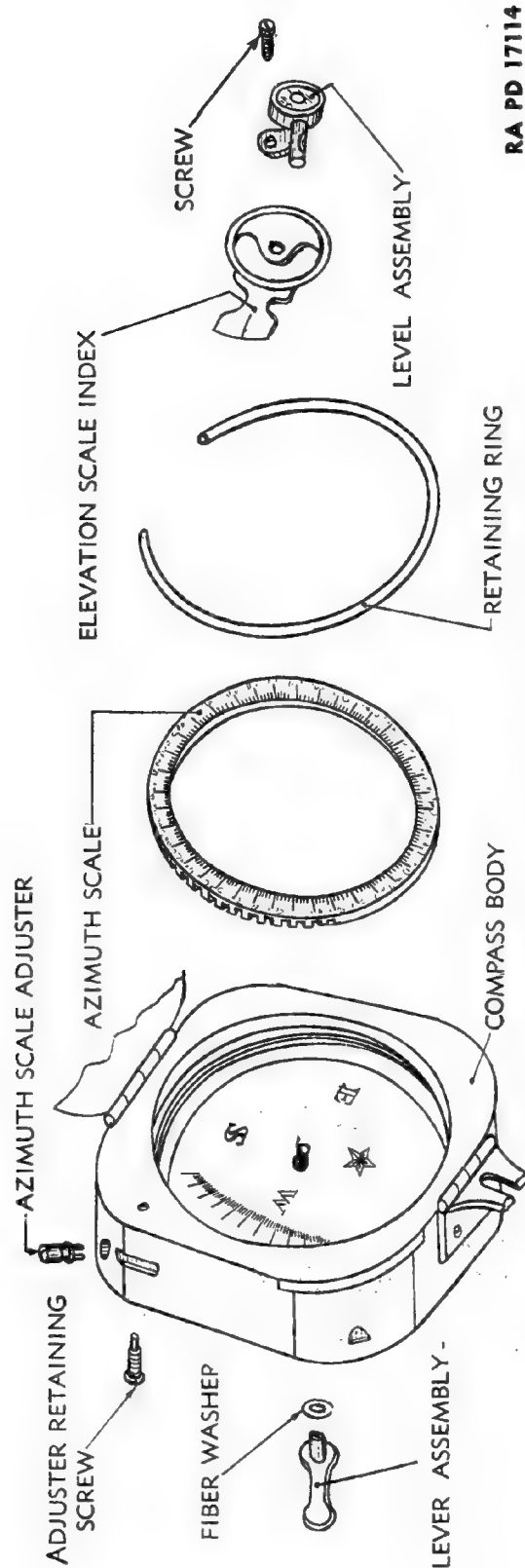


FIGURE 14.—Disassembly of azimuth scale, level assembly and related parts.

*g. To disassemble azimuth scale and related parts.*—(1) Remove the compass window by following the procedure given in *c*(1) above.

(2) Remove the azimuth scale split ring by means of a screw driver. Lift out the azimuth scale. Remove the dog point screw and extract the azimuth scale adjuster from the compass body.

*h. To reassemble azimuth scale and related parts.*—Follow the same procedure for reassembling as for disassembling, but in the reverse order. Care should be exercised that the teeth on the azimuth scale are properly meshed with the pin teeth on the adjuster before replacing the other parts.

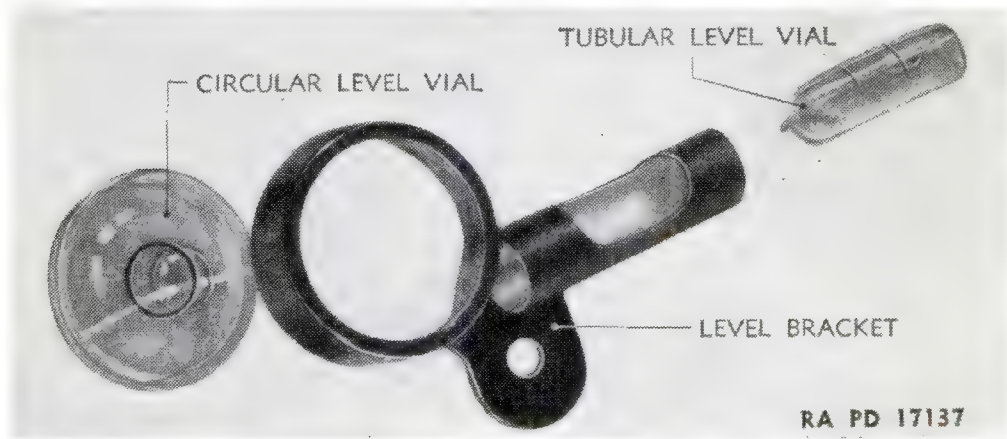


FIGURE 15.—Disassembly of level vials.

*i. To disassemble sights.*—Refer to figures 14 and 16. Remove the front or rear sight by first removing the two countersunk head screws from the compass body. Access can now be had for driving out the tapered pins in the sights if necessary.

*j. To reassemble sights.*—Follow the same procedure for reassembling as for disassembling, but in the reverse order. To avoid injuring the parts involved, care should be exercised that the tapered holes in the sights and holders are properly matched before the pins are driven into place. The front and rear sights should be assembled so that the countersunk surfaces on the sights face each other when the sights are in position, as shown in figure 17. For adjustment, refer to paragraphs 7*h* and *n*.

**NOTE.**—After assembly has been completed the instrument should again be checked to see that it conforms to the inspection requirements listed in paragraph 5*b*.

**9. Painting.**—*a. General.*—The painting of instruments must be supervised by someone familiar with the functioning of the instruments. Care should be exercised that no paint comes in contact with



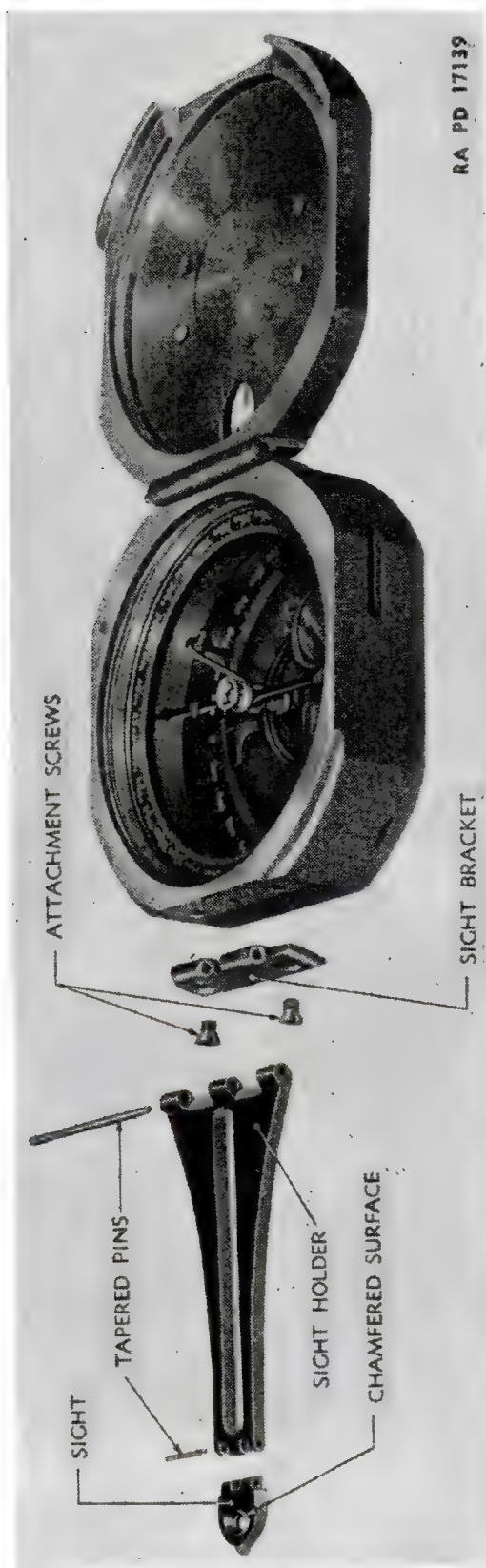
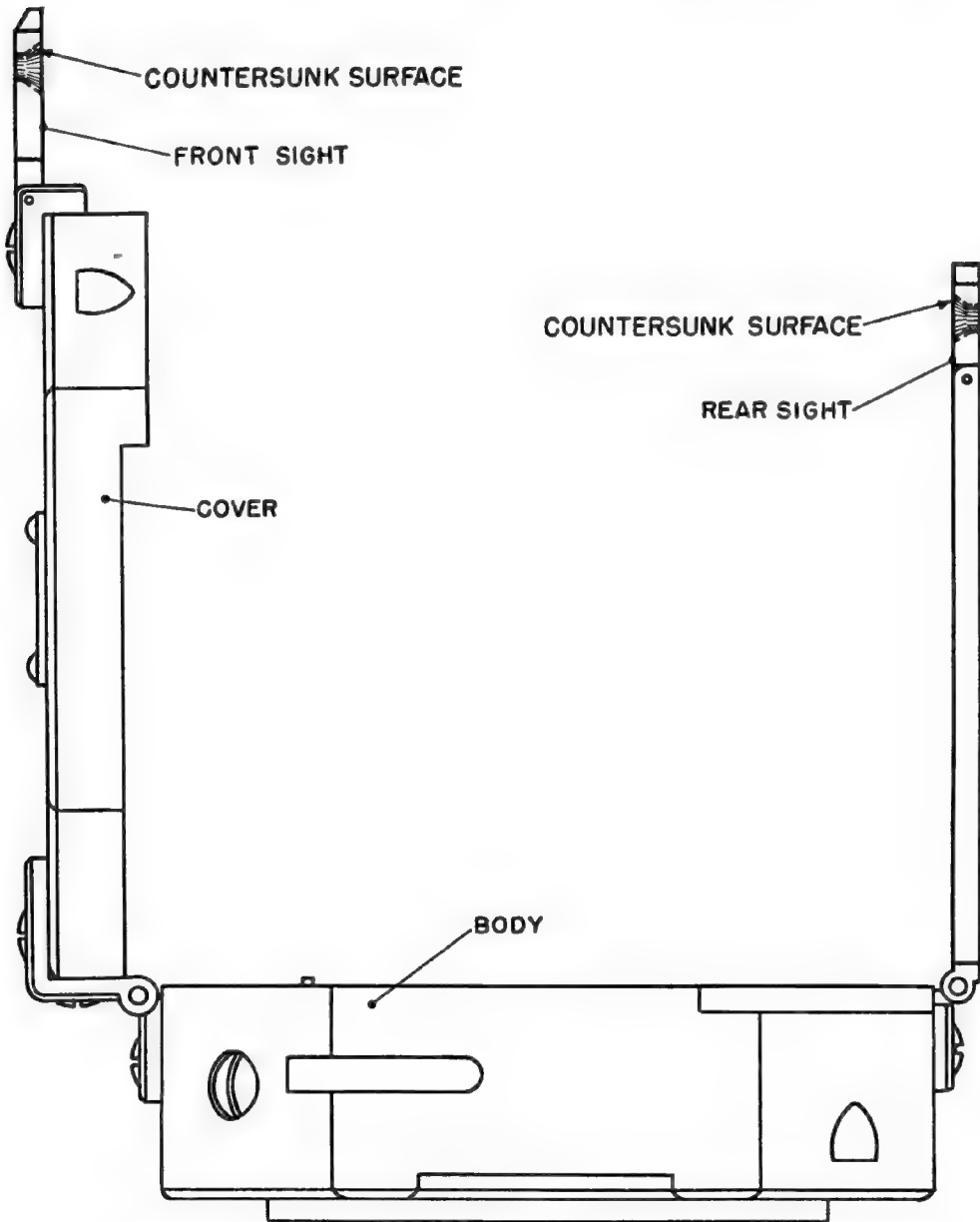


FIGURE 16.—Disassembly of rear sight.

scales, gear teeth, and bearing surfaces. Ordnance matériel is painted before issue and from time to time afterward depending upon service conditions and climatic conditions to which the matériel is subjected.



RA PD 17144

FIGURE 17.—Location of countersunk surfaces of front and rear sights.

*b. Preparing for painting.*—(1) *General.*—All surfaces to be painted must be dry and free of dirt, oil, grease, and rust. For cleaning, use dry-cleaning solvent and rinse with hot water. Dry in an air stream. It must be remembered that frequent washing of metal

components in the same batch of solvent will soon render it unfit for further use, since it easily becomes saturated with grease, oil, and dirt. The solvent must be changed frequently.

(2) *To remove old paint.*—Remove loose paint around marred parts by rubbing those parts with paper, flint, No. 1. Dust off all loose sand and paint flakes.

*c. Painting.*—(1) Apply the paint with a brush or with a spray gun. Exercise care to avoid splashing or spraying paint on parts which are not to be painted. Finished colors must match authorized or prescribed hues. Minor deviations of pigment proportions are permissible, if necessary to match colors.

(2) Use white scale filler for painting graduations. Clean the graduation marks and apply a thin coat of white filler. Wash off surplus filler with soap, castile, and water; rinse in clean water and dry.



APPENDIX

LIST OF REFERENCES

1. **Standard Nomenclature Lists.**

- a. Cleaning, preserving, and lubricating materials----- SNL K-1
- b. Fire-control matériel:
  - Compass M2----- SNL F-219
  - Kit, instrument repair----- SNL F-206
  - Truck, instrument repair, M1----- SNL G-92
  - Current Standard Nomenclature Lists are as tabulated here.
  - An up-to-date list of SNL's is maintained as the "Ordnance Publication for Supply Index"----- OPSI

2. **Explanatory publications.**

- a. Cleaning, preserving, lubricating, and welding materials, and similar items issued by the Ordnance Department----- TM 9-850
- b. Fire-control matériel:
  - Field artillery fire-control instruments----- TM 6-220
  - Instruction Guide, the instrument repairman----- TM 9-2602
  - Compass M2----- TC 22
- c. Miscellaneous:
  - 75-mm gun matériel M1897 and modifications----- TM 9-305
  - 75-mm gun and carriage M1917 and modifications.. TM 9-315
  - 75-mm howitzer matériel----- TM 9-320
  - 105-mm howitzer matériel M1A1 and M2----- TM 9-325
  - 155-mm howitzer matériel M1917, M1918 and modifications----- TM 9-330
- d. Maintenance:
  - Maintenance of matériel in hands of troops----- OFSB 4-1
  - Special Instructions, Group F----- OFSB 4-8
  - Storage and issue----- TM 10-250

[A. G. 062.11 (6-18-42).]

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(For explanation of symbols see FM 21-6).

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